

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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In re Patent Application of:  
Allen Ray Harrison

Conf. No.: 2684

Application No.: 10/099,825

Art Unit: 3625

Filed: March 15, 2002

Examiner: R. M. Pond

For: METHOD, APPARATUS AND SYSTEM FOR  
PROVIDING ADVISORY INFORMATION  
FOR A WEB-BASED SALES APPLICATION

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**DECLARATION PURSUANT TO 37 CFR § 1.131**

In connection with the Applicants' Response to the Office Action dated April 4, 2008, this Declaration sets forth the pertinent facts proving actual reduction to practice of the claimed invention no later than **February 22, 2000**.

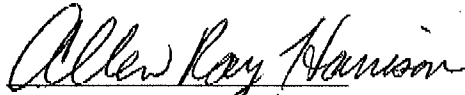
1. We, Allen Ray Harrison, Bruce Alan Oney, Murli Challappa, and James H. White (hereinafter "the Inventors"), are the inventors of the subject matter described and claimed in U.S. Patent Application Serial No. 10/099,825 entitled "Method, Apparatus and System for Providing Advisory Information for a Web-Based Sales Application" (hereinafter, the "'825 Application").
2. We, the Inventors, conceived and implemented our invention as described and claimed in the '825 Application in the US and the UK (a WTO member country).
3. We, the Inventors, conceived and implemented our invention as described and claimed in the '825 Application no later than February 22, 2000, as evidenced by:

- (i) a screen shot of a file directory for a file system storing various presentations including a Jim\_toolbox\_demo presentation, a JobPlanner2000\_final presentation, a FE\_AnswerProducts99fin presentation, a ServiceAdvisor presentation, and the last modified dates of the presentations (*see* Tab A).
- (ii) the Jim\_toolbox\_demo presentation having the last modified date of February 10, 1999, and showing multiple screen shots from the invention described and claimed in the '825 Application (*see* Tab B);
- (iii) the Job\_Planner2000\_final presentation having the last modified date of March 29, 1999, and showing sample user requirements, oilfield products and services to satisfy the user requirements, multiple recommendation values for the oilfield products and services, and one or more ranked lists comprising the oilfield products and services, as described and claimed in the '825 Application (*see* Tab C);
- (iv) the FE\_AnswerProducts99fin presentation having the last modified date of September 10, 1999, and showing, at least, the multiple features and operation of the correlation engine and advisor function module, as described and claimed in the '825 Application (*see* Tab D); and
- (v) the ServiceAdvisor presentation having the last modified date of February 22, 2000, showing oilfield products and services to satisfy

user requirements, multiple recommendation values for the oilfield products and services, and one or more ranked lists comprising the oilfield products and services, as described and claimed in the '825 Application (*see* Tab E).

We, the Inventors, hereby declare that all statements made herein of my own knowledge are true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Signed this 6<sup>th</sup> day of October 2008.

  
Allen Ray Harrison

Signed this \_\_\_\_ day of October 2008.

\_\_\_\_\_  
Bruce Alan Oney

Signed this \_\_\_\_ day of October 2008.

\_\_\_\_\_  
Murli Challappa

Signed this \_\_\_\_ day of October 2008.

\_\_\_\_\_  
James H. White

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Signed this \_\_\_\_ day of October 2008.

\_\_\_\_\_  
Allen Ray Harrison

Signed this 3<sup>rd</sup> day of October 2008.

\_\_\_\_\_  
Bruce Alan Oney

Signed this \_\_\_\_ day of October 2008.

\_\_\_\_\_  
Murli Challappa

Signed this \_\_\_\_ day of October 2008.

\_\_\_\_\_  
James H. White

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Signed this \_\_\_\_ day of October 2008.

\_\_\_\_\_  
Allen Ray Harrison

Signed this \_\_\_\_ day of October 2008.

\_\_\_\_\_  
Bruce Alan Oney

Signed this 2<sup>nd</sup> day of October 2008.

Murli Challappa  
\_\_\_\_\_  
Murli Challappa

Signed this \_\_\_\_ day of October 2008.

\_\_\_\_\_  
James H. White

user requirements, multiple recommendation values for the oilfield products and services, and one or more ranked lists comprising the oilfield products and services, as described and claimed in the '825 Application (*see* Tab E).

We, the Inventors, hereby declare that all statements made herein of my own knowledge are true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Signed this \_\_\_\_ day of October 2008.

\_\_\_\_\_  
Allen Ray Harrison

Signed this \_\_\_\_ day of October 2008.

\_\_\_\_\_  
Bruce Alan Oney

Signed this \_\_\_\_ day of October 2008.

\_\_\_\_\_  
Murli Challappa

Signed this 3 day of October 2008.

James H. White  
James H. White

TAB A

FE\_21\_Projects

File

Edit

View

Favorites

Tools

Help

Back

Forward

Search

Folders

Address

C:\Documents and Settings\jnm\Desktop\SLB 108001\ARCHIVE\_jw\FE\_21\_Projects

File and Folder Tasks

Other Places

Details

Name	Size	Type	Date Modified
ToolAdvisor		File Folder	9/25/2008 6:00 AM
vb_work		File Folder	9/25/2008 6:01 AM
Jim_toolbox_demo	379 KB	Microsoft PowerPoint...	2/10/1999 1:59 AM
JobPlanner2000_final	567 KB	Microsoft PowerPoint...	3/29/1999 1:53 PM
FE_AnswerProducts99fin	1,621 KB	Microsoft PowerPoint...	9/10/1999 1:30 PM
ServiceAdvisor	875 KB	Microsoft PowerPoint...	2/22/2000 11:51 AM
Revolutionizing_Formation_Ev...	1,080 KB	Adobe Acrobat 7.0 ...	10/24/2003 10:10 AM



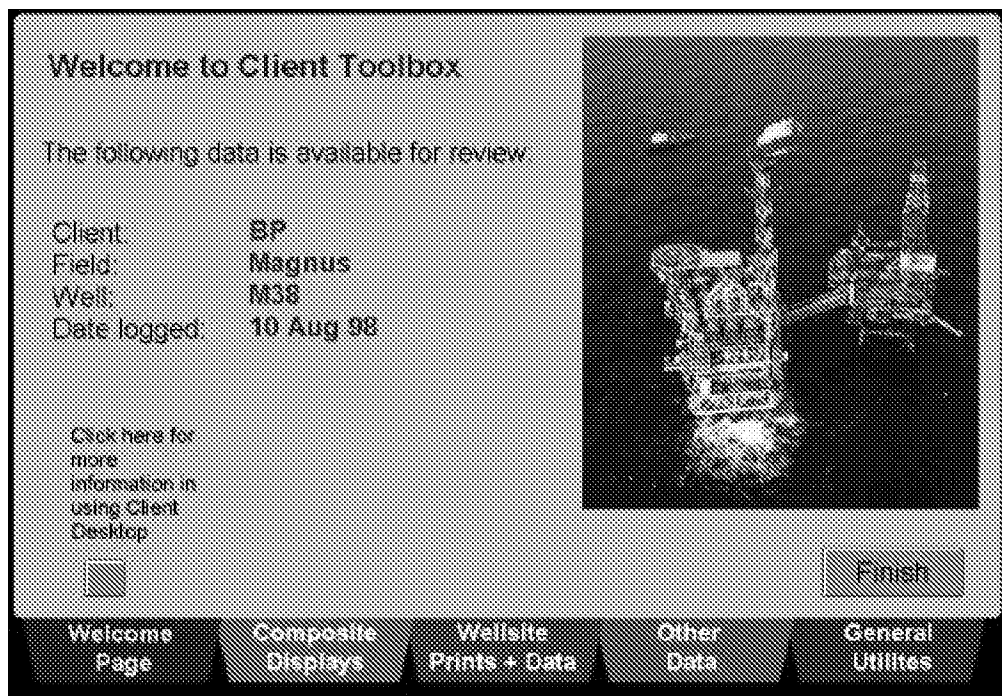
TAB B

## Client Toolbox

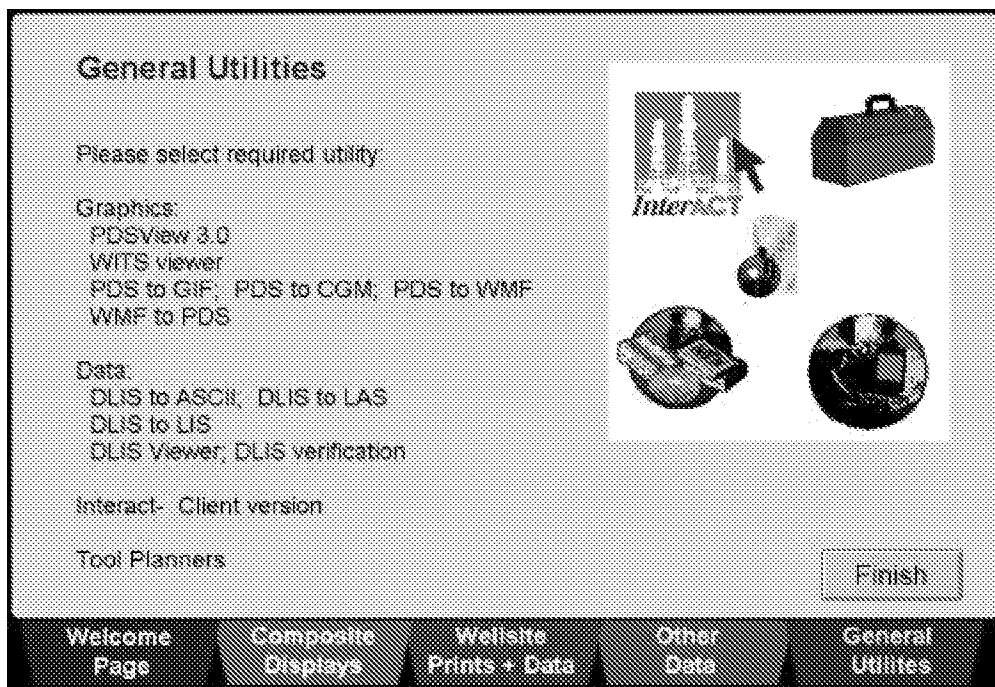
Attached are a series of screenshots from a short interactive demo. They show how a Client deliverable using the Toolbox might look in two to three years time.

This is NOT a definitive description of how the Toolbox will look!

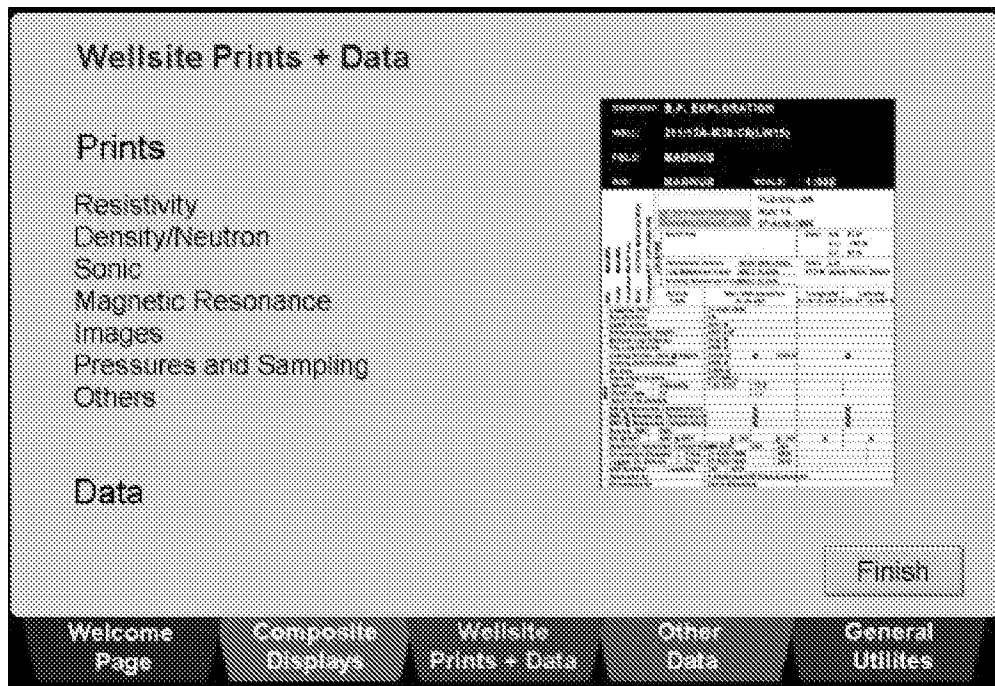
## Front screen (welcome page)



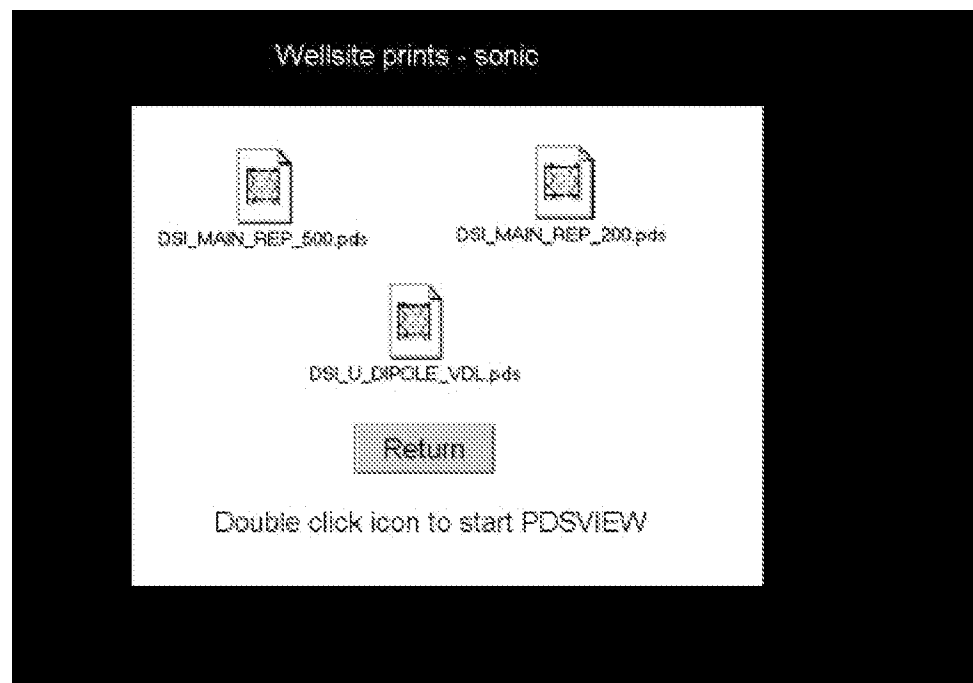
Press general utilities tab to get.....



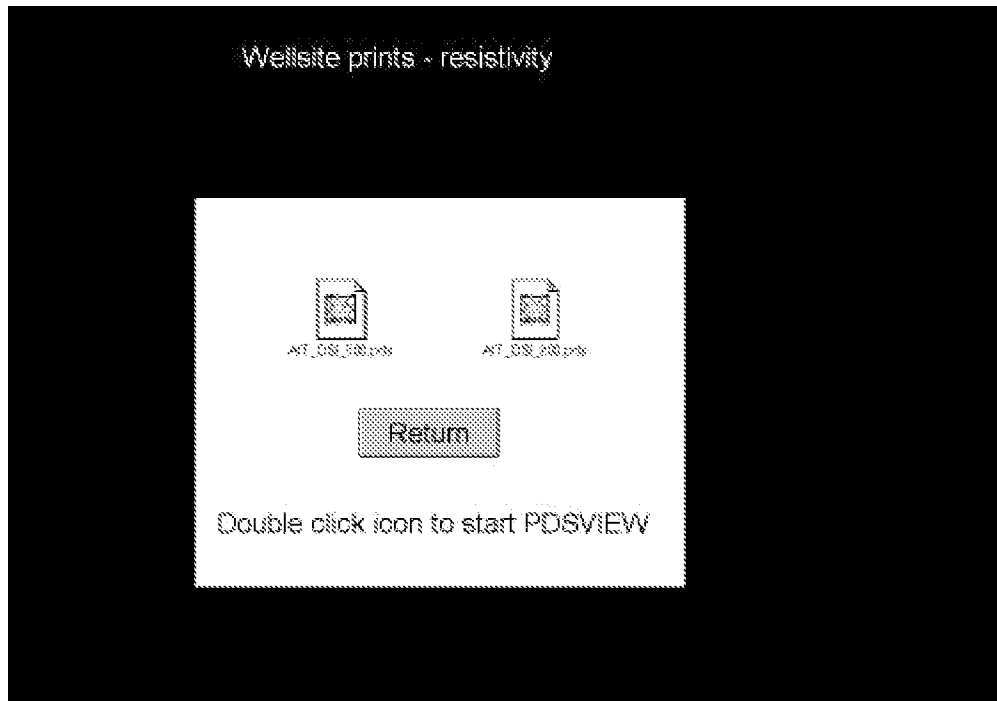
Press 'Wellsite Prints + Data' tab to get.....



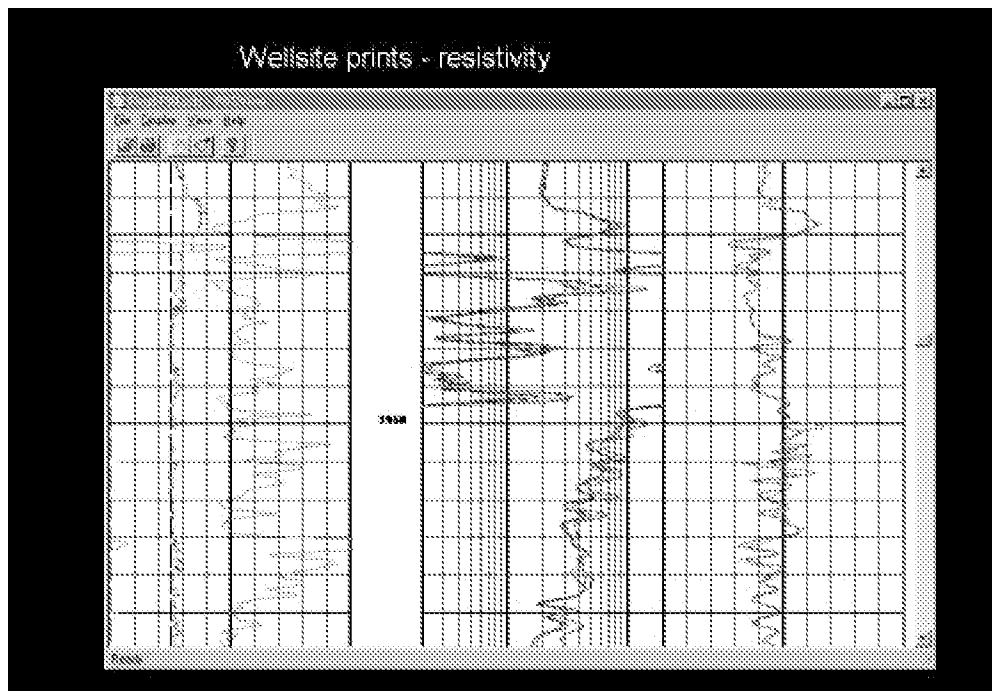
...then select 'Sonic' to get.....



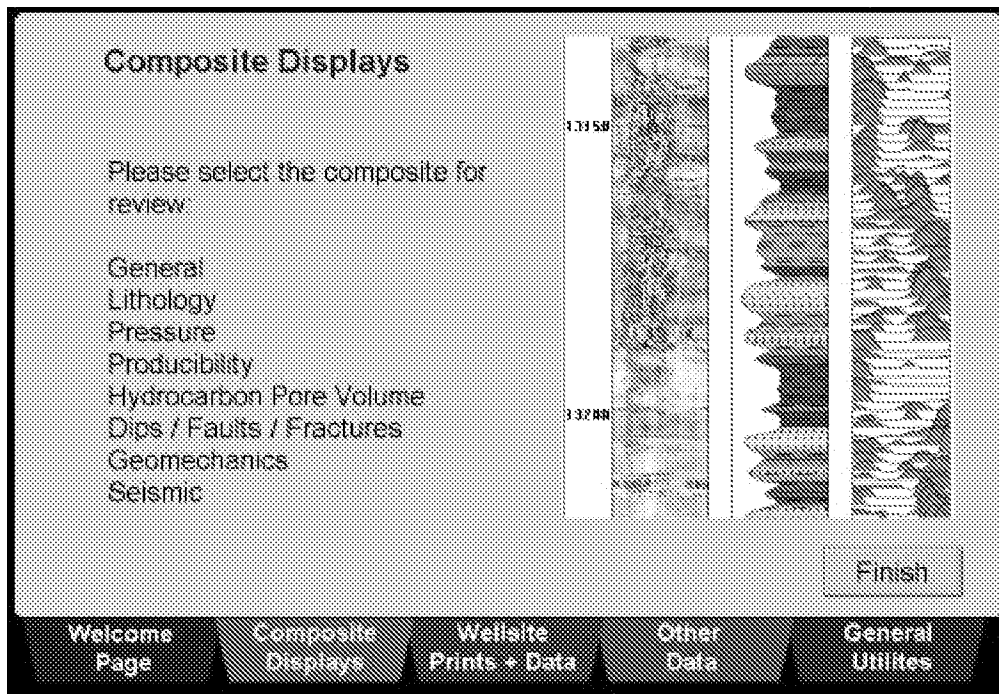
or select 'Resistivity' to get.....



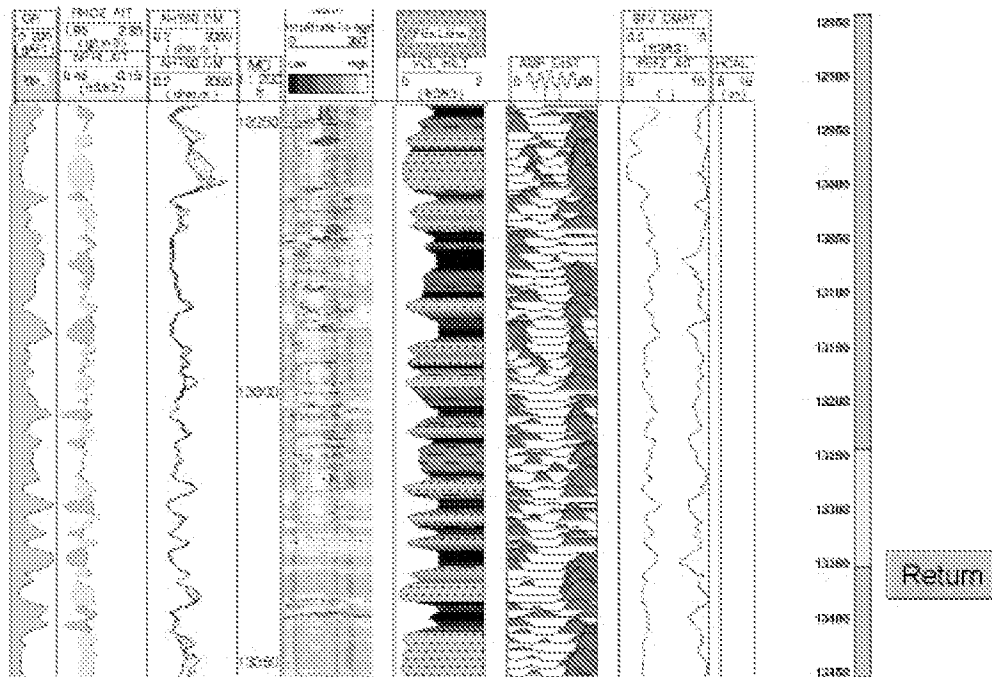
... and double click AIT\_DSI\_500.pds to fire up PDSView



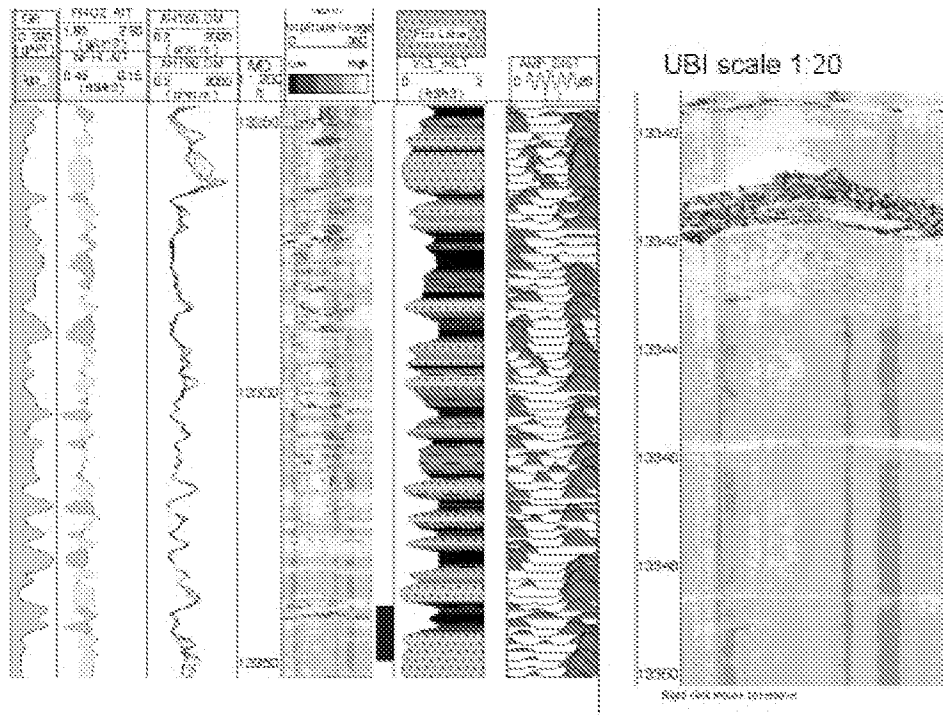
Back to main menu 'composite display' tab.....



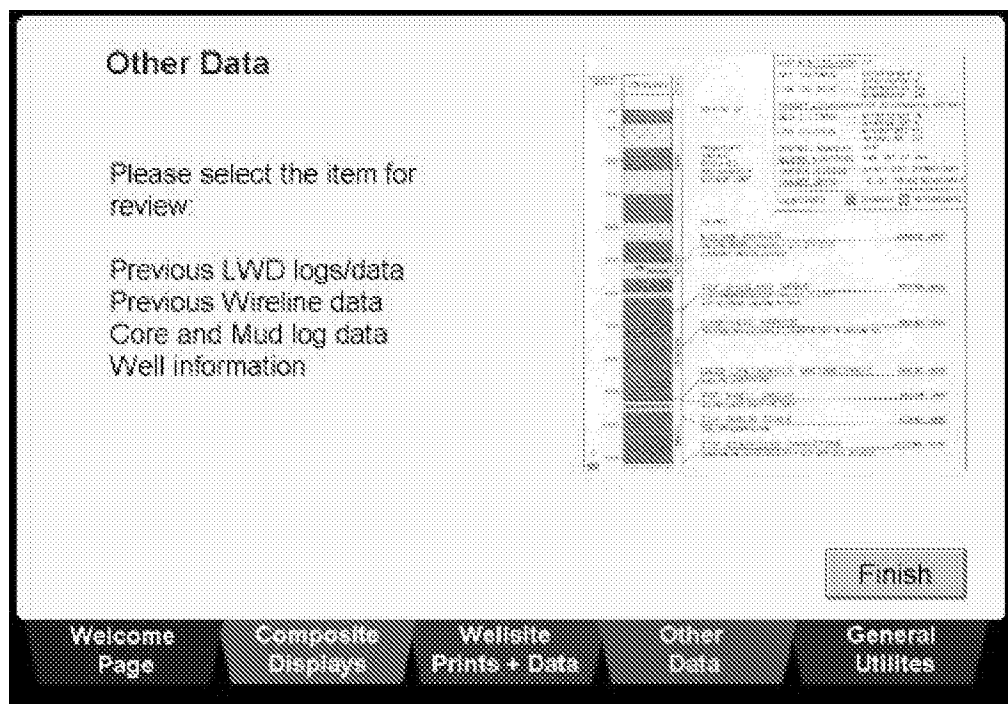
....press 'lithology' to get.....



....select part of UBI display to enlarge.....



Back to main menu 'Other Data' tab.....



Press 'finish' button.....





TAB C

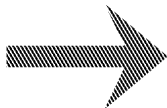
## Job Planner - Menu Page

What the client/account manager needs to do:

- *select geological model and reservoir texture*
- *identify needs*
- *supply remaining background information*
- *select tools from recommended list*

What forms are then available?

- *Summary page*
- *Reservoir objectives*
- *Summary by hole size: 17.5", 12.25", 8.5"*
- *Summary by conveyance: LWD, WL - OH, WL - CH*



(select the blue text above to jump to the correct page when in presentation mode, then click "Back" button to return to this page)

First time  
users...  
[Click here](#)

End show

For more information on Job Planner: review workflow,  
review product description

**Some notes on this presentation.....**

**This is a first pass review on a possible “look and feel” for a Job Planner. There are no options to input information yet, so please do not attempt to do so!**

**You are recommended to review this in presentation mode, and navigate only by the hyperlink buttons from the Menu Page.**

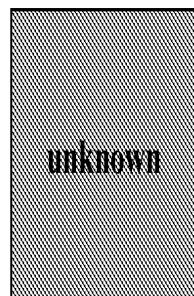
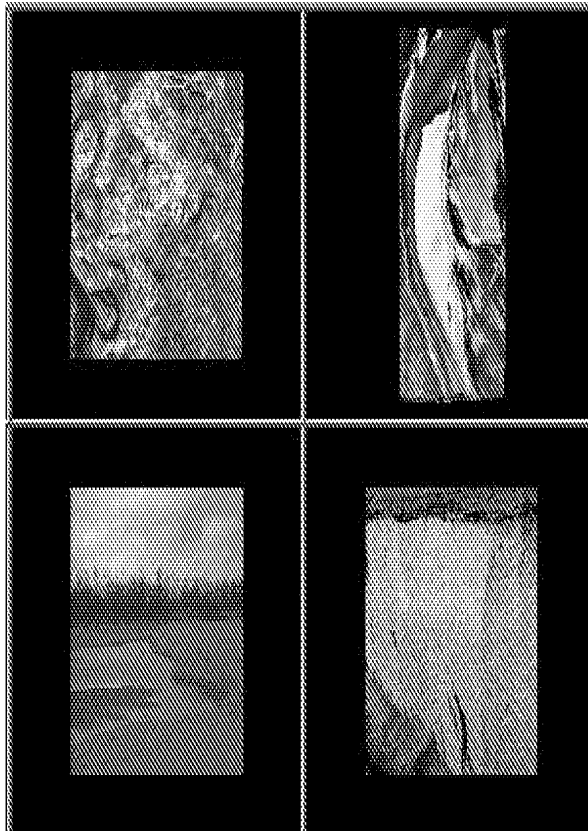
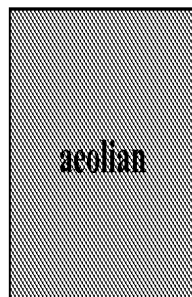
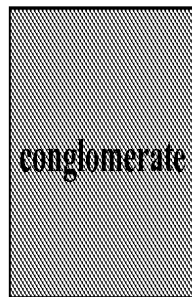
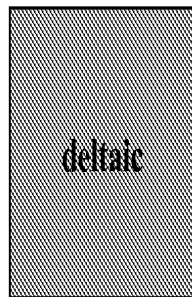
**Use the “Back” button to return to the Menu Page.**



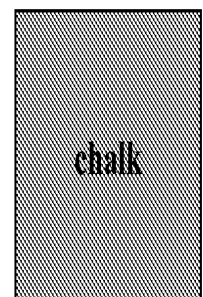
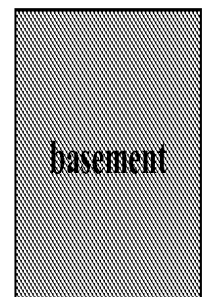
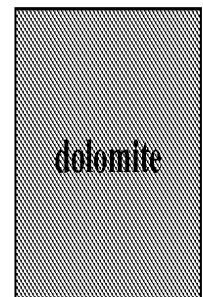
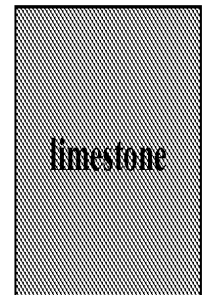
# Geological model

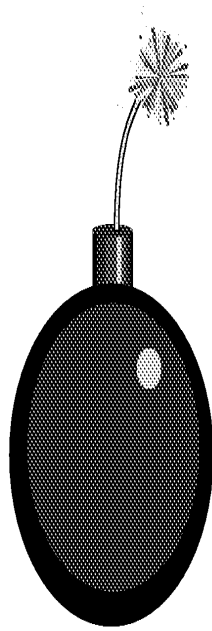
(Select one to represent your target reservoir)

## *Clastic*



## *Carbonate*





**Note that selections are not activated yet.....**

**....please navigate using the hyperlinks**

**Back**

# Reservoir texture

thin  
beds

reef

unconsolidated

high  
apparent  
dip

unknown

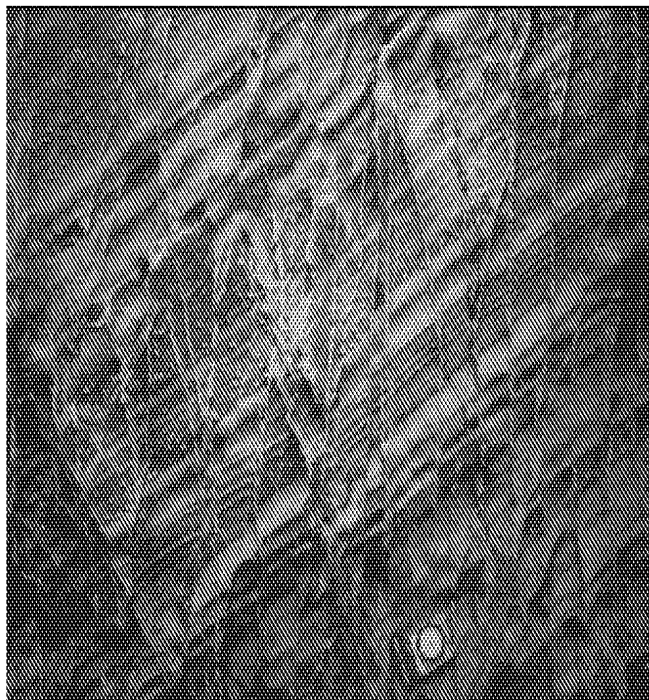
fractured

complex  
lithology

faulted

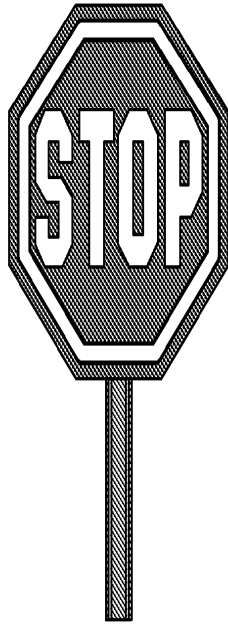
stressed

homogeneous



Back

(If known, select one or more that represents your reservoir.)



**Note that selections are not activated yet.....**

**....please navigate using the hyperlinks**

**Back**

# Possible Client needs from a data acquisition program

Net pay

Faults/  
fractures

Seismic  
calibration

Producibility

Geomechanics

Hydraulic  
isolation

Lithology

Pressure

Fluid  
redistribution

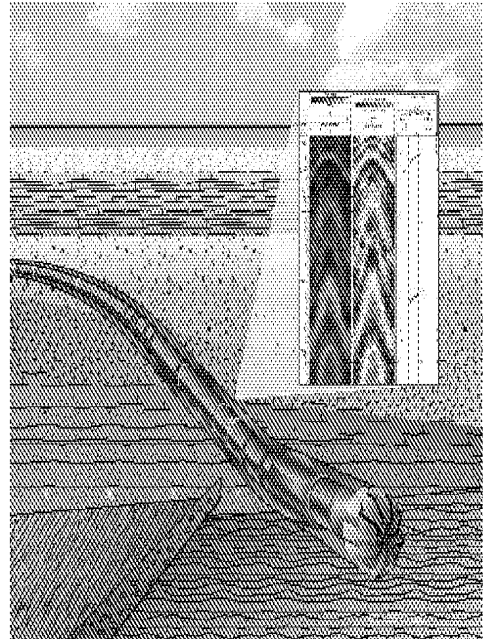
Others  
(specify)

Dips

Fluid type

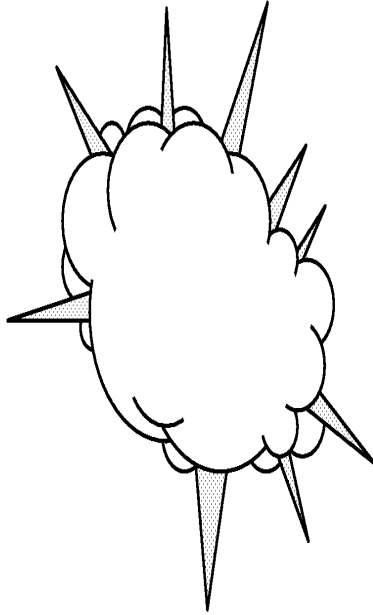
Completion  
efficiency

Back



(Select one or more that represent your requirements.)





**Note that selections are not activated yet.....**

**....please navigate using the hyperlinks**

**Back**

## Other background information

Porosity  
range

likely  
minerals

Permeability  
range

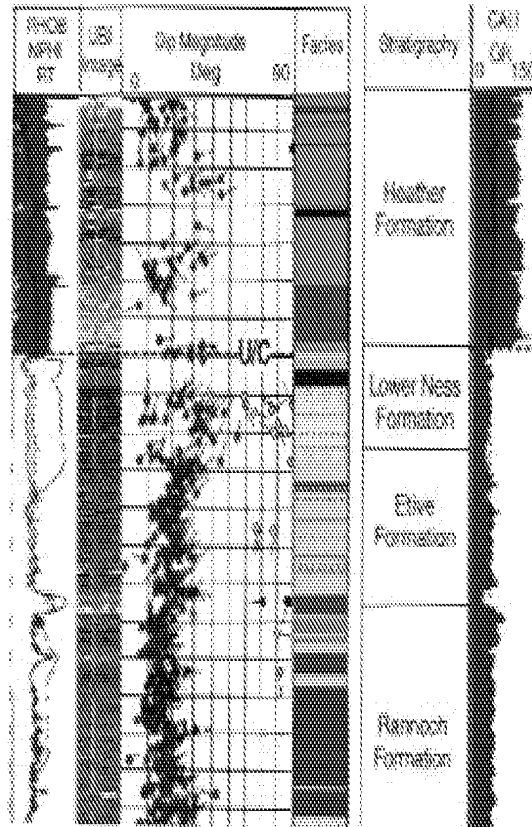
Borehole  
environment

Fluid  
properties

Hole  
profile

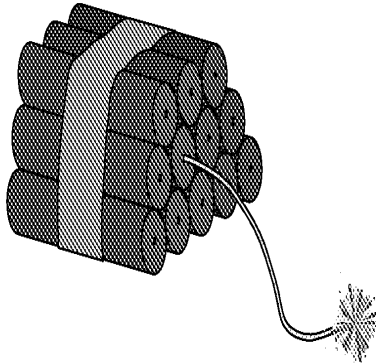
Pore  
pressure

Other  
factors



Back

(Where known, please fill out the information requested in each box.)



**Note that selections are not activated yet.....**

**....please navigate using the hyperlinks**

**Back**

Well:   
Field:

# Job Planner - Summary

Client contact:   
SLB contact:

	17 1/2"	12 1/4"	8 1/2"
mud type / weight	OBM / 9.1	OBM / 10.5	OBM / 12.5
max. dev. + DLS	15deg. / 2 deg/100'	45 deg. / 3 deg/100'	75deg. / 2 deg/100'
max. temperature	<250	<250	280
interval top/bot.	2100'-5300'	5300'-8200'	8200'-10450'
Primary objective	Time/depth calibration	Time/depth calibration	Net Pay Reservoir pressure Producibility
LWD sensors	CDR-GR	CDR-GR	ADN-CDR-ISONIC-GR
OH wireline	DIT-LDL-DSI-GR	PEX-AITH-DSI-GR	MDT-CMR-UBI (tlc) CBL-VDL-GR (12 1/4")
CH wireline	-	CBL-VDL-GR (to be run with 8 1/2" job)	CBL-VDL-GR (12 1/4", 8 1/2") Perfo. / PS platform
Comments	Run DITE only if any section not logged with CDR	Run AITH only if any section not logged with CDR	Try gravity decent to avoid TLC job.

**Back**

Well:   
 Field: 

# Job Planner - Reservoir Objectives

	17.5"	12 1/4"	8 1/2"
interval top/bot.	2100'-5300'	5300'-8200'	8200'-10450'
Primary objectives	Time / Depth calibration; Detect near-surface gas (RT)	Time / Depth calibration Correlation, realtime	Net Pay (real time) Reservoir pressure Producibility No formation damage
Secondary objectives	Correlation with offset data;	Lithology Poissons ratio for geophys.	Lithology; Reservoir architecture Fluid type Time / Depth calibration; Cement evaluation >6000'
Measurement type (suggested by objectives)	Sonic density resistivity (realtime) GR	Vp +Vs from sonic density / neutron resistivity / GR (realtime) GR	Resistivity (realtime) Density / Neutron (realtime) NMR, Spectroscopy, Sonic, Imaging, Formation Tester Fluid analyser, Flowmeter TCP, CBL/VDL
Comments			

**Back**

Well:   
Field:

# Job Planner - 17.5"

Client contact:   
SLB contact:

## Measurement type

(taken from Reservoir Objectives)

Sonic  
density  
resistivity (realtime)  
GR

Mud type / weight @ Bottom hole temperature.

OBM / 9.1 @ <250F

Max. deviation. + Dogleg severity

15deg. / 2 deg/100'

Interval, top -->bottom

2100'-5300'

LWD

WL-OH

WL-CH

Sensors suggested

*CDR-GR*

*DIT-LDL-DSI-GR*

Sensors chosen

*CDR-GR*

*DIT-LDL-DSI-GR*

Comments

Run DITE only if  
any section not  
logged with CDR

Run DITE only if  
any section not  
logged with CDR

**Back**

Well:   
Field:

# Job Planner - 12 1/4"

Client contact:   
SLB contact:

## Measurement type

(taken from Reservoir Objectives)

Vp +Vs from sonic  
density / neutron  
resistivity / GR (realtime)  
GR

Mud type / weight @ Bottom hole temperature.

OBM / 10.5 @ <250F

Max. deviation. + Dogleg severity

45 deg. / 3 deg/100'

Interval, top -->bottom

5300'-8200'

LWD

WL-OH

WL-CH

Sensors suggested

*CDR-GR*

*PEX-AITH-DSI-GR*

Sensors chosen

*CDR-GR*

*PEX-AITH-DSI-GR*

Comments

Run DITE only if  
any section not  
logged with CDR

**Back**

Well:   
Field:

# Job Planner - 8 1/2"

Client contact:   
SLB contact:

## Measurement type

(taken from Reservoir Objectives)

Resistivity (realtime)  
Density / Neutron (realtime)  
NMR, Spectroscopy, Sonic  
Imaging, Formation Tester  
Fluid analyser, Flowmeter  
TCP, CBL/VDL

Mud type / weight @ Bottom hole temperature.

OBM / 12.5 @ 280F

Max. deviation. + Dogleg severity

75deg. / 2 deg/100'

Interval, top -->bottom

8200'-10450'

### LWD

### WL-OH

### WL-CH

#### Sensors suggested

*ADN-CDR-GR*

*MDT-CMR-UBI (tlc)*  
*CBL-VDL-GR (12 1/4")*

*TCP -5"*  
*PSP - surface readout*

#### Sensors chosen

*ADN-CDR-ISONIC-GR*

*MDT-CMR-UBI (gravity)*  
*or*  
*MDT-CMR-UBI-DSI (tlc)*  
*CBL-VDL-GR (12 1/4")*

*TCP - 5"*  
*PSP - memory*

#### Comments

ISONIC demonstration  
- do not charge if w/l log  
also run

ISONIC demonstration  
- do not charge if w/l log  
also run

PSP on slickline, as deep as  
possible.  
(1p22 cable may have  
problems going down.

**Back**



Well:   
Field:

# Job Planner - LWD

Client contact:   
SLB contact:

	hole size (casing) 17.5" (13 3/8)	12 1/4" (9 5/8)	8 1/2" (7)
Mud type / weight @ temp.	OBM / 9.1 @ <250F	OBM / 10.5 @ <250F	OBM / 12.5 @ 280F
Max. dev. + Dogleg	15deg. / 2 deg/100'	45 deg. / 3 deg/100'	75deg. / 2 deg/100'
Interval top -->bottom	2100'-5300'	5300'-8200'	8200'-10450'
Measurement type (from Reservoir objectives)	Sonic density resistivity (realtime) GR	Vp +Vs from sonic density / neutron resistivity / GR (realtime) GR	Resistivity (realtime) Density / Neutron (realtime) NMR, Spectroscopy, Sonic Imaging, Formation Tester Fluid analyser, Flowmeter TCP , CBL/VDL
LWD sensors (suggested)	CDR-GR	CDR-GR	ADN-CDR-GR
LWD sensors (chosen)	CDR-GR	CDR-GR	ADN-CDR-ISONIC-GR
Comments	Run DITE only if any section not logged with CDR		ISONIC demonstration - do not charge if w/l log also run

Back

Well:   
Field:

# Job Planner - WL(OH)

Client contact:   
SLB contact:

	Hole size (casing)	17.5" (13 3/8)	12 1/4" (9 5/8)	8 1/2" (7)
Mud type / weight @ temp.		OBM / 9.1 @ <250F	OBM / 10.5 @ <250F	OBM / 12.5 @ 280F
Max. dev. + Dogleg		15deg. / 2 deg/100'	45 deg. / 3 deg/100'	75deg. / 2 deg/100'
Interval top -->bottom		2100'-5300'	5300'-8200'	8200'-10450'
Measurement type (from Reservoir objectives)		Sonic density resistivity (realtime) GR	Vp +Vs from sonic density / neutron resistivity / GR (realtime) GR	Resistivity (realtime) Density / Neutron (realtime) NMR, Spectroscopy, Sonic Imaging, Formation Tester Fluid analyser, Flowmeter TCP , CBL/VDL
WL sensors (suggested)		DIT-LDL-DSI-GR	PEX-AITH-DSI-GR	MDT-CMR-UBI (tlc) CBL-VDL-GR (12 1/4")
WL sensors (chosen)		DIT-LDL-DSI-GR	PEX-AITH-DSI-GR	MDT-CMR-UBI (gravity) or MDT-CMR-UBI-DSI (tlc) CBL-VDL-GR (12 1/4")
Comments		Run DITE only if any section not logged with CDR	Run DITE only if any section not logged with CDR	ISONIC demonstration - do not charge if w/l log also run

**Back**

Well:   
Field:

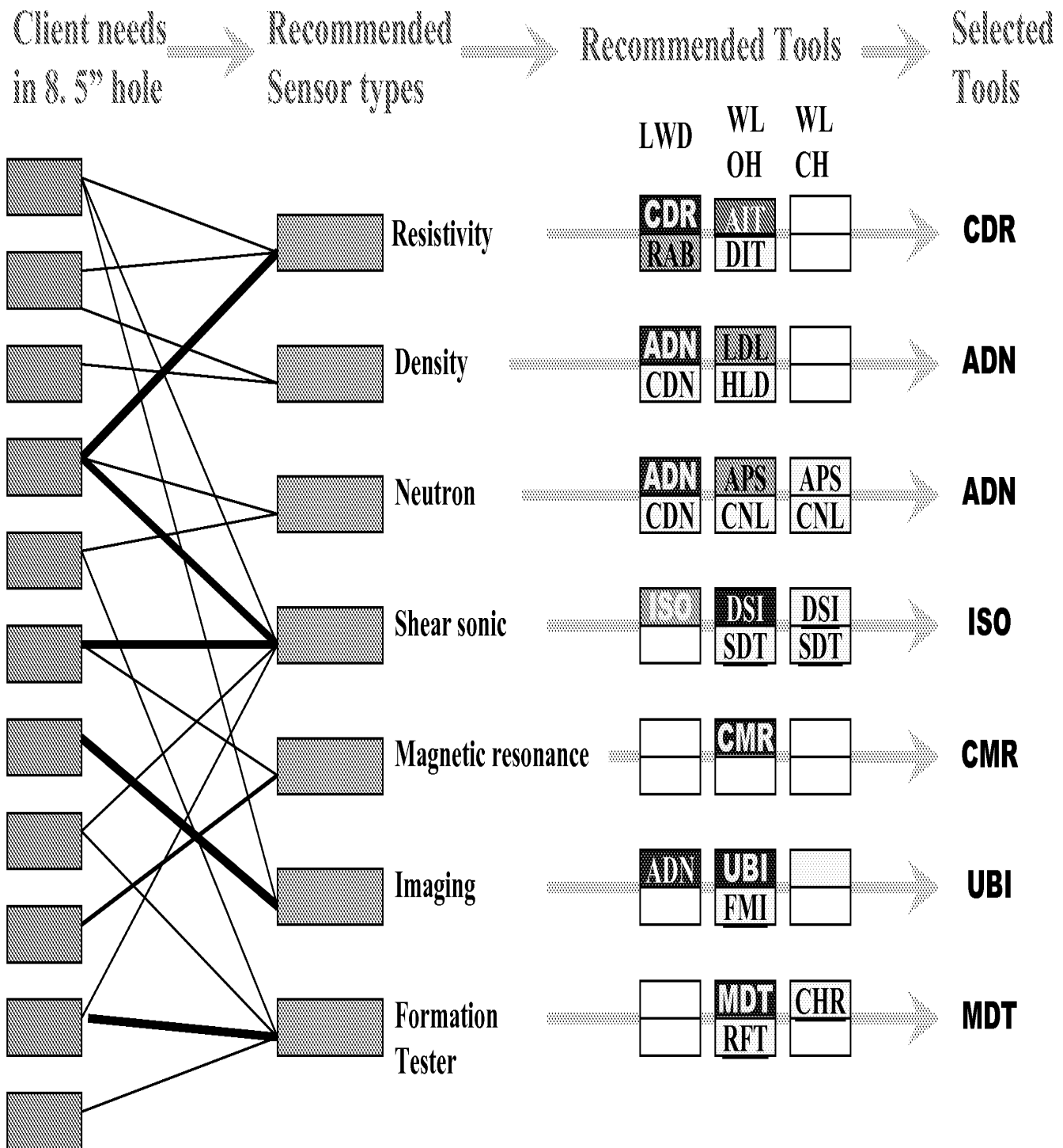
# Job Planner - WL(CH)

Client contact:   
SLB contact:

	Hole size (casing)	17.5" (13 3/8)	12 1/4" (9 5/8)	8 1/2" (7)
Mud type / weight @ temp.		OBM / 9.1 @ <250F	OBM / 10.5 @ <250F	OBM / 12.5 @ 280F
Max. dev. + Dogleg		15deg. / 2 deg/100'	45 deg. / 3 deg/100'	75deg. / 2 deg/100'
Interval top -->bottom		2100'-5300'	5300'-8200'	8200'-10450'
Measurement type (from Reservoir objectives)		Sonic density resistivity (realtime) GR	Vp +Vs from sonic density / neutron resistivity / GR (realtime) GR	Resistivity (realtime) Density / Neutron (realtime) NMR, Spectroscopy, Sonic Imaging, Formation Tester Fluid analyser, Flowmeter TCP , CBL/VDL
WL-CH sensors (suggested)				TCP -5" PSP - surface readout
WL-CH sensors (chosen)				TCP - 5" PSP - memory
Comments				PSP on slickline, as deep as possible. (1p22 cable may have problems going down.

Back

Click on particular Recommended Tool to make selection, or leave blank.



Recommendation  
"level"



CDR

4

AIT

3

RAB

2

DIT

1

0

Client  
selection

Back



**Note that selections are not activated yet.....**

**....please navigate using the hyperlinks**

**Back**

## ***Objective of Job Planner:***

To identify what the Client(s) requirements are, and match them to an acquisition program.

Link the logs acquired back into an Answer Product deliverable (typically a composite log)

*For the Client this ensures a 'fit for purpose' acquisition program that has robust support (if queried by his management!)*

*For SLB this ensures we do not overlook any opportunity to increase revenue.*

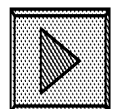
## ***Features of Job Planner:***

4 Stages of job planning suggested (see next page)....use *graphical* interactive displays where possible. We should also be able to load a profile (eg North Sea jurassic, HPHT, Saudi Khuff, etc.) or a previously saved Job Planning session.

Illustrated help on choices should be made available at any stage.

A local list of contacts to discuss technical issues should also be made available

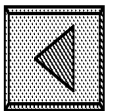
An audit trail should exist for the suggested logging program. (ie. why did the planner suggest DSI? - if requested, the program can show a 'textbook' example linking the client need to the suggested logging program.)



## ***4 suggested stages of Job Planning:***

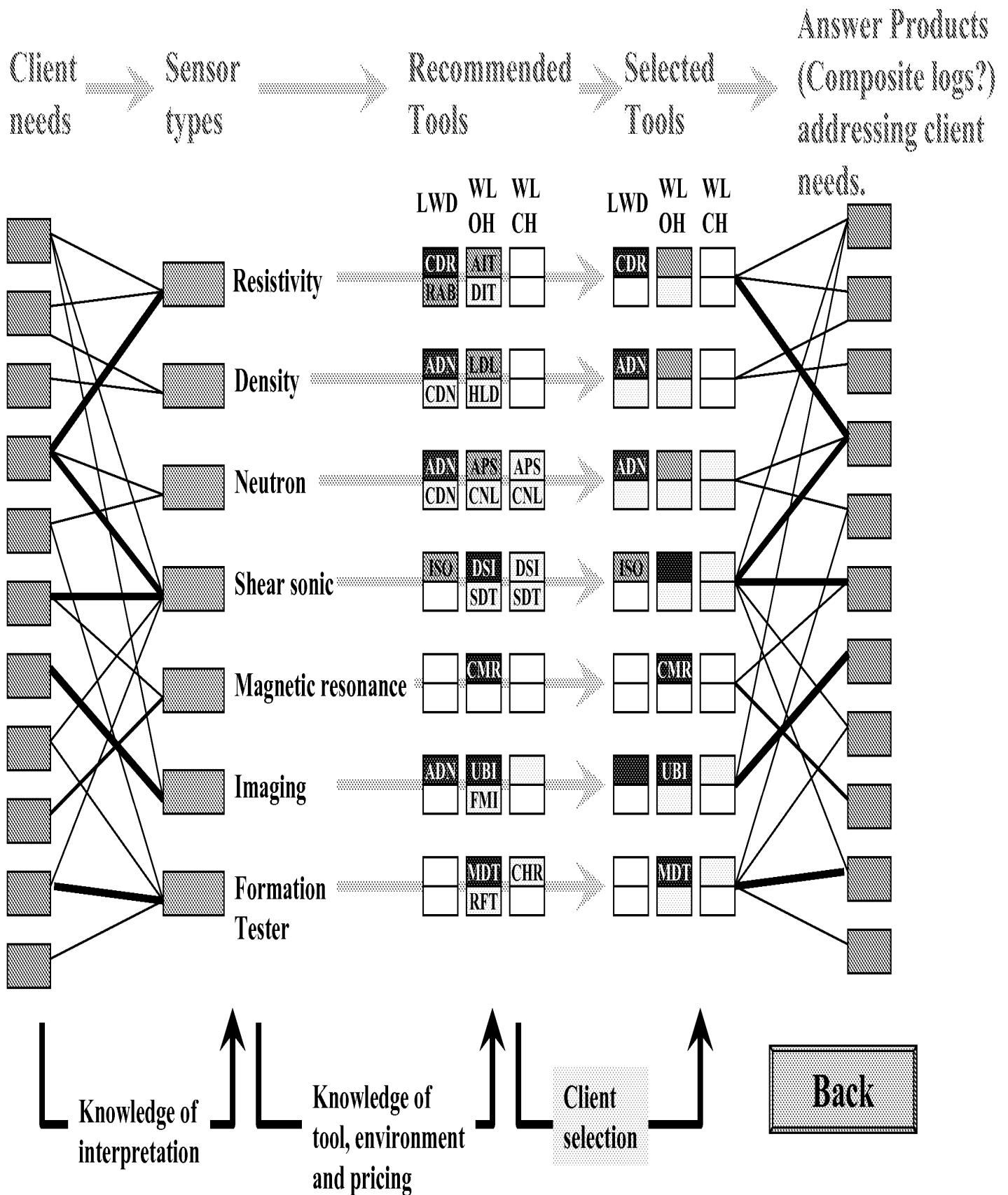
- 1 Identify basic reservoir lithology
    - (deltaic, conglomerate, aeolian, chalk, limestone, dolomite, basement)
  - Identify basic reservoir texture
    - (thin beds, fractured, high dip, reef, complex lithology, stressed, unconsolidated)
  - Identify likely reservoir features
    - porosity range, fluid properties, pressure, permeability
  - 2 Review what client needs to know in each hole size.  
For example, across the reservoir section, s/he needs:
    - net pay before projected TD is reached
    - reservoir pressure
    - sonic calibration data
    - zonal isolation confirmation
  - 3 Suggest sensor types that could answer these needs.  
For example: Density, Neutron, Resistivity, Sonic, Formation pressure, Check shot...  
Sensor type choice should be *independent* of conveyance or open/cased hole environment.
  - 4 Translate this list to a recommended logging program, taking into account the environmental conditions (mud, hole angle, size, temperature, hole condition) giving for example:
    - ADN, CDR, ISONIC (Logging While Drilling)
    - UBI, MDT, CMR (Wireline)
    - Check shot, CBL-VDL (Cased Hole)
- Use individual Tool Planners where available to assist parameter selection.

*Remember, allow the client the final choice of the actual logging program!*



**Menu**

# Workflow summary





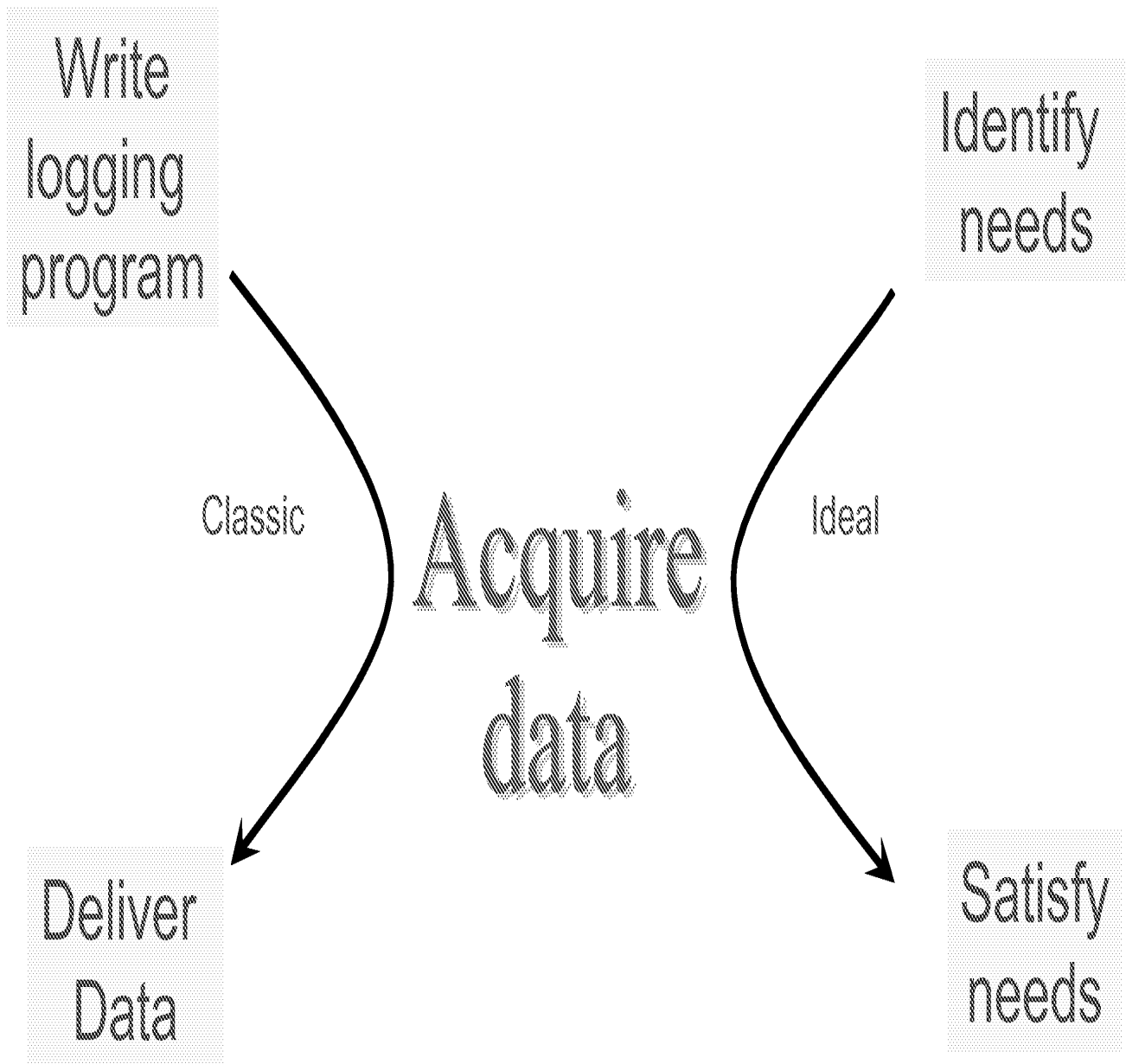
[Back](#)

TAB D

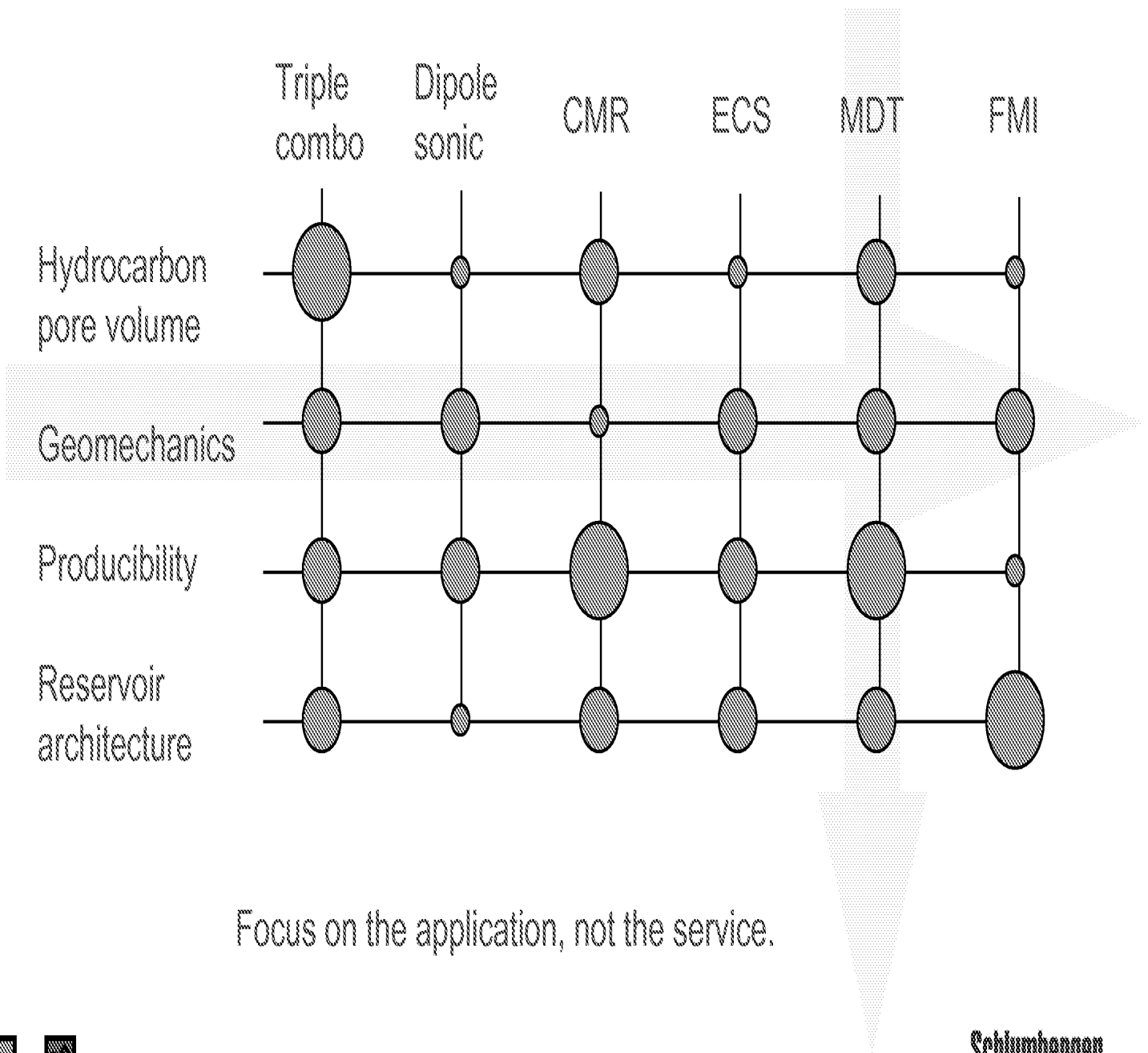
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## Classic / Ideal service

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# The role of the Answer Process



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# Practical implementation

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Software tools can help in this transformation of

needs



sensors choice



satisfying needs

Brief demo of:

Tool Advisor (sensor selection “wizard”)

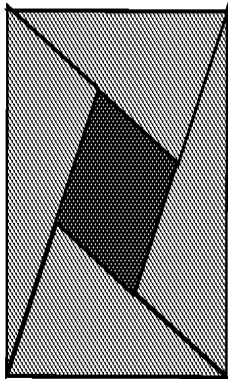
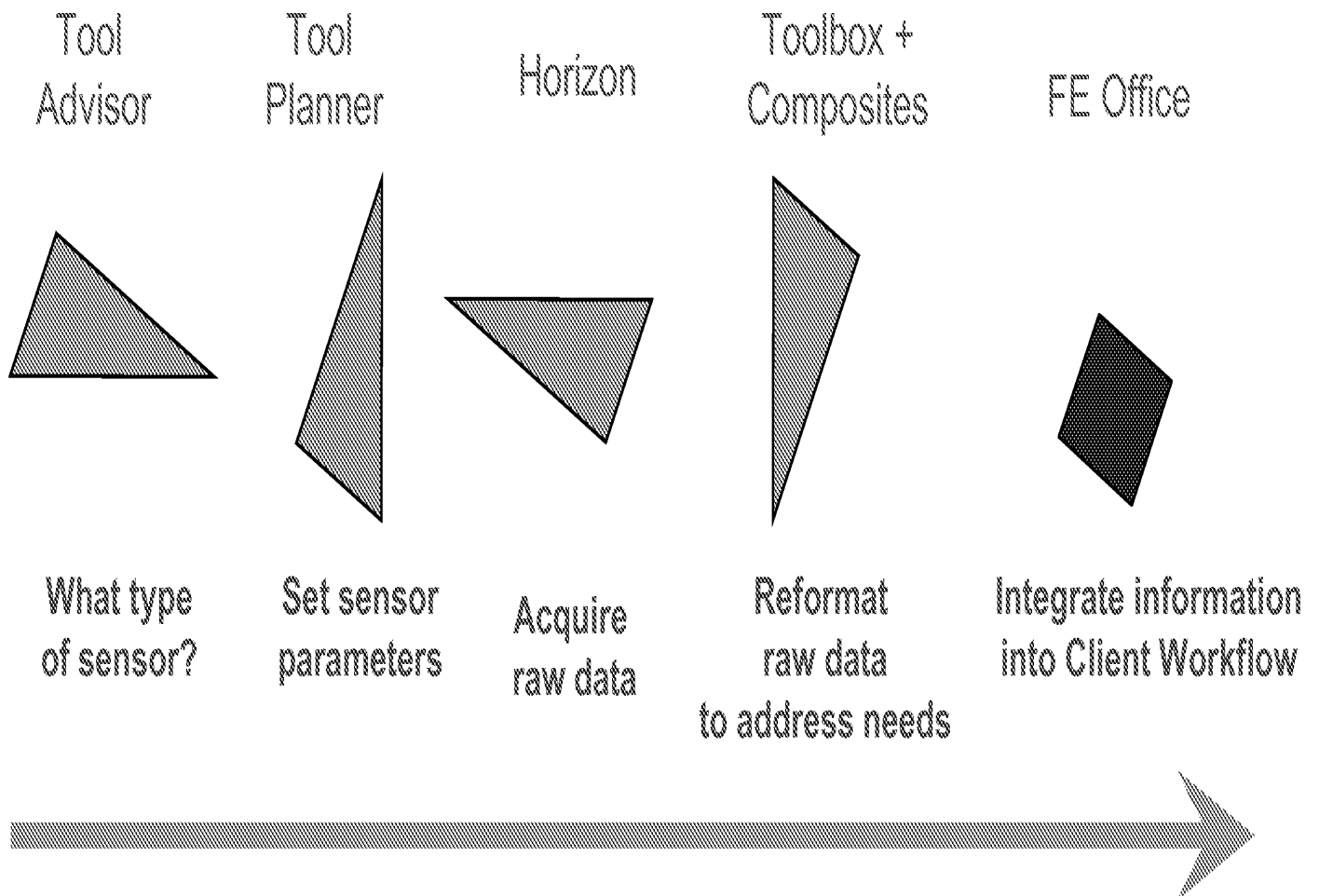
Interactive Composite Display



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# Answer Process Workflow - scenario

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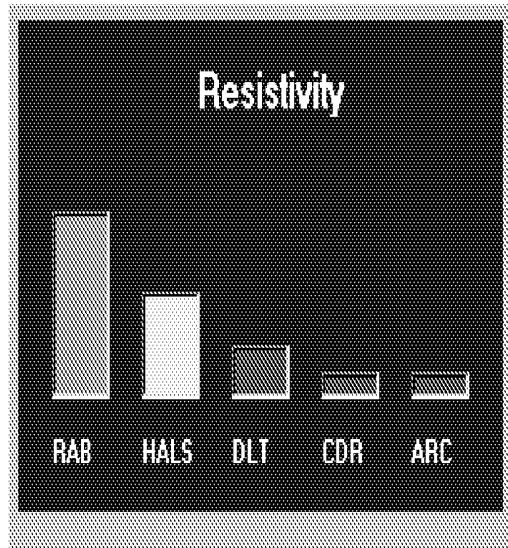
*Objective....*

*Assimilate all useful data into Client workflow, where it can immediately assist in decision making.*

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# Tool Advisor

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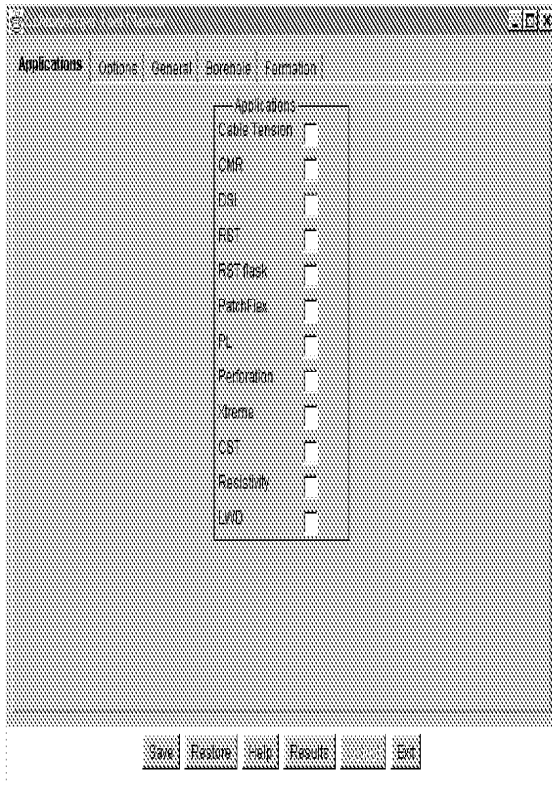
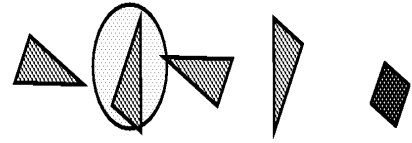


- Reinforces logging tool selection
- Uncovers missed opportunities for further sensors
- Advertises the range of sensors available
- Consolidates the link between LWD and WL
- Provides lead into “Tool Planners”



Schlumberger

# Tool Planner

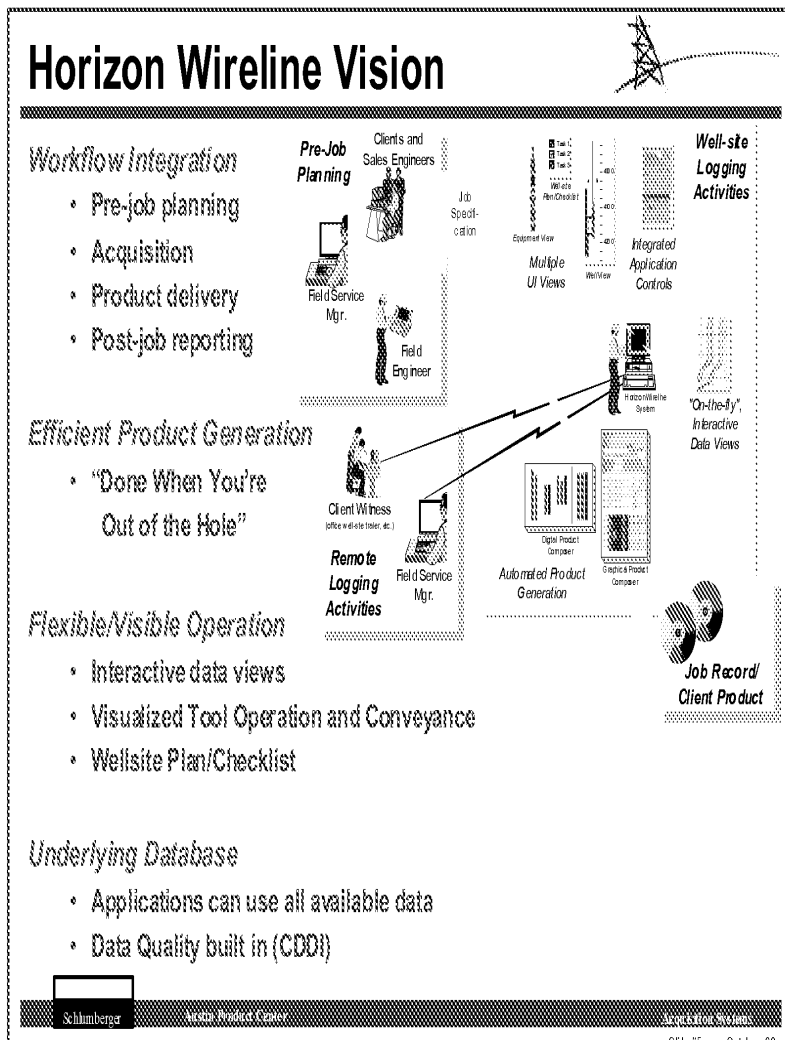
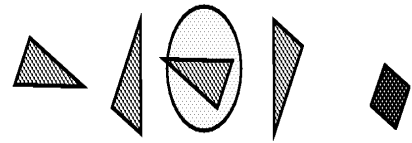


Acquisition Parameters		
Tool mode	Sandstone depth	
Wait time	1.3	s
Number of echoes	1200	
Echo spacing	200.0	us
Logging speed	584.4	ft/hr
Vertical resolution	18.0	in
Repetition	1	
Downhole stacking	3	

- Optimize acquisition parameters of selected sensors
- Transfer parameter choices into Horizon Acquisition system

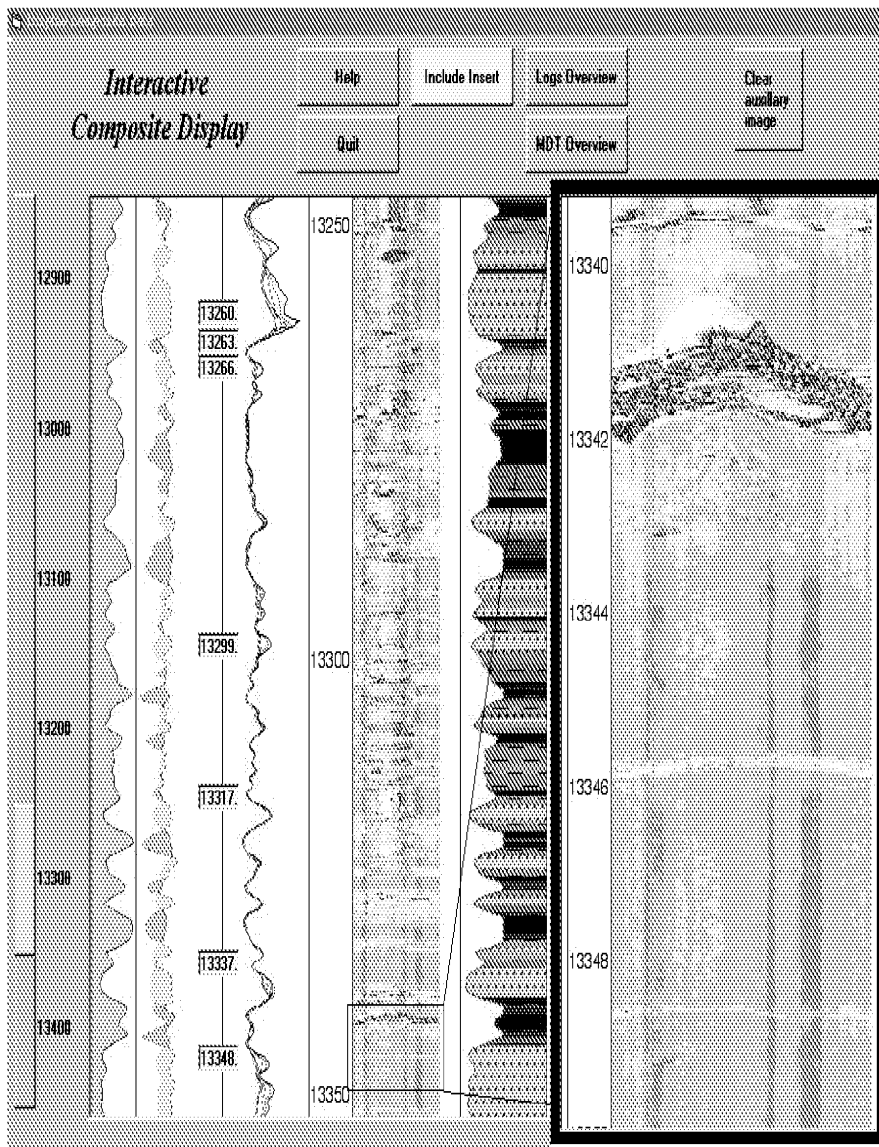
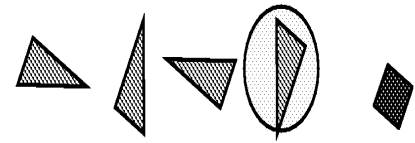


# Horizon



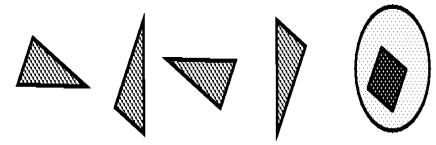
Horizon is part of the delivery process. It must be designed to easily receive information (e.g. from tool Planners) and then pass on information (e.g. data and graphics to Client Toolbox and FE Office)

# Client Toolbox



Toolbox 1.0 already underway, providing data and graphical manipulation tools for DLIS and PDS.

Next stage needs to address composite log delivery, possibly interactive products delivered on CD/DVD.



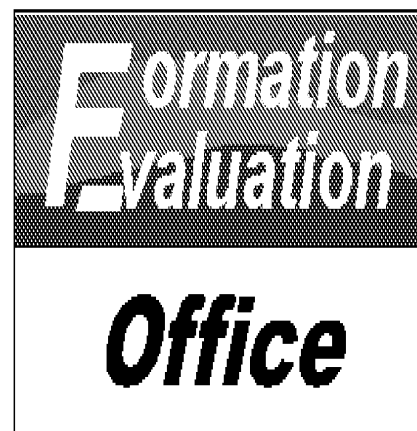
We should not always rely just on our technological “edge” to remain competitive, we also need to communicate it effectively.

A powerful way to achieve this is to provide the interpretation software environment in which the data is delivered.

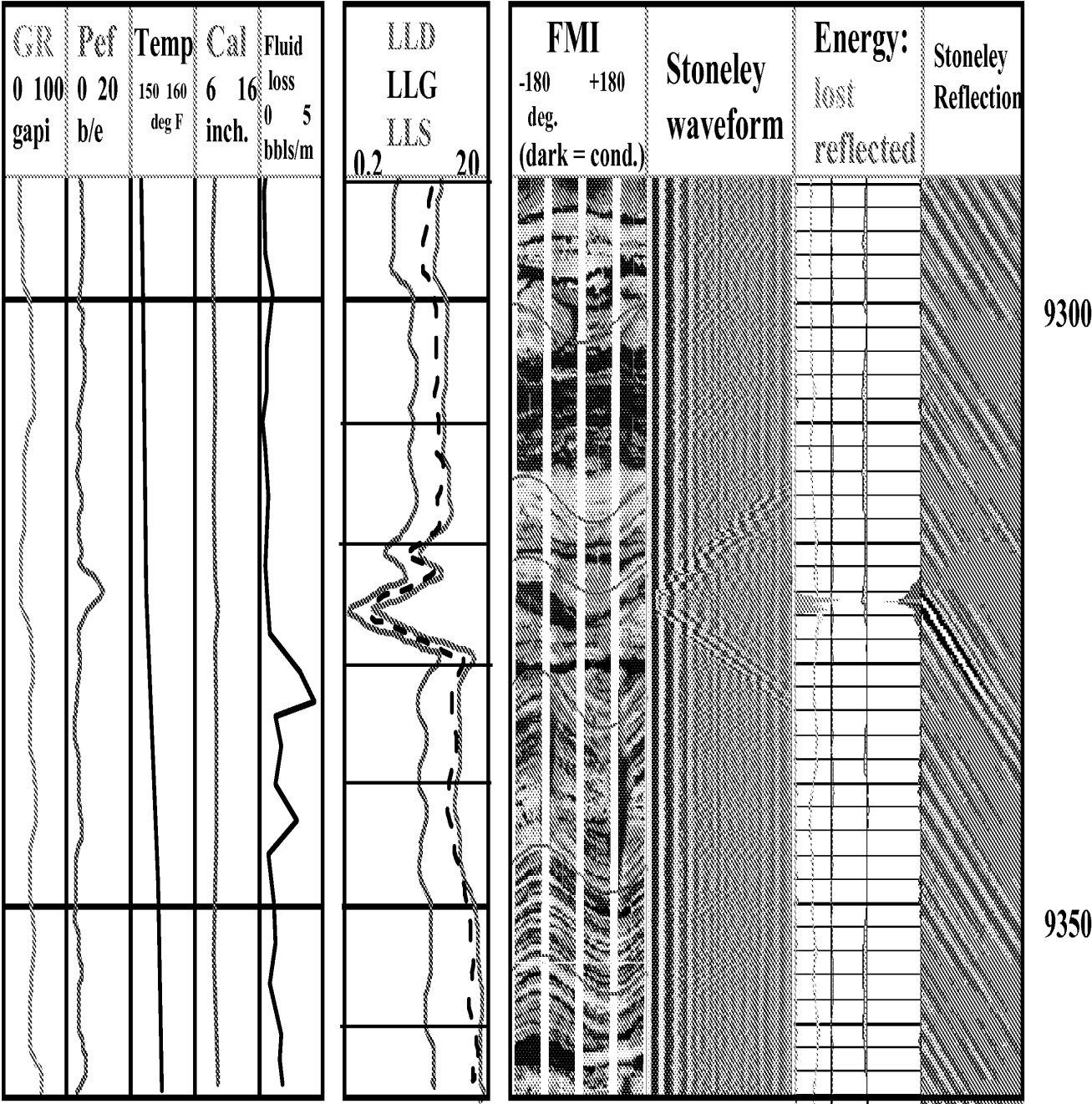
*This does not happen today because:*

- our interpretation platform is not widely available*
- our software usability is poor and inefficient*

FE Office is designed to address this:



# Answer Products composite example

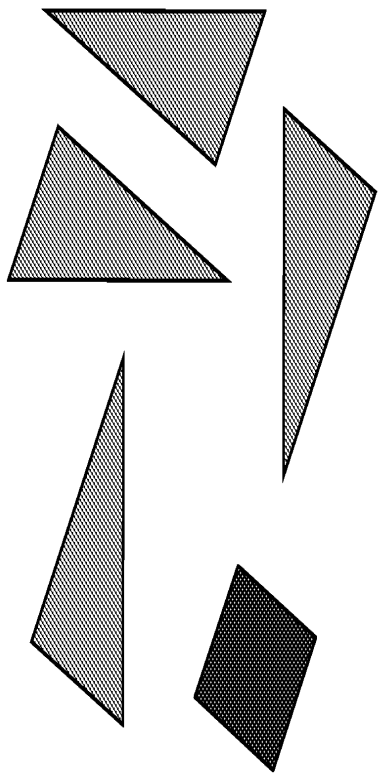


Fracture detection composite

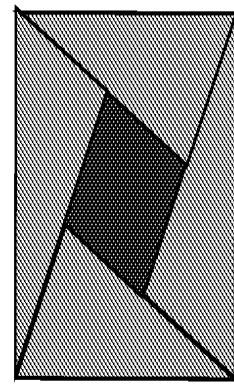
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# Answer Product Delivery - the future

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Separate initiatives.....



.....or integrated approach?



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# Features of a good answer product

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- Available promptly
- Addresses client need
- Presentation / computation easy to modify
- No (obvious) incremental cost
- Widely accessible
- Easy to transfer results to client workflow
- Contribution of sensors clearly visible

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# Deliverables

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*A clients perception of our data may be totally defined by the Answer Product delivered.*



*We should regain control over the way our clients see our data.*



TAB E

# Service Advisor - Overview

Purpose of Service Advisor    *Enhance WL and LWD acquisition revenue.*

Who can use it?                *Our sales, marketing, ID, FSMs, Field engineers. (and possibly clients.)*

What does it do?               *Captures the clients requirements and matches them to a suite of LWD or Wireline tools*

# Service Advisor - Overview (2)

What other information is needed apart from client needs?

*Any extra information about the reservoir and operating environment is used to improve the recommended list of logging tools.*

Why do we need such a program?

*The decision making information is collected in one place.  
Ensures that both the client and ourselves maximise the value of SLB service.*

# Service Advisor - Overview (3)

Is it available today?

*A working program is available to demonstrate this concept.*

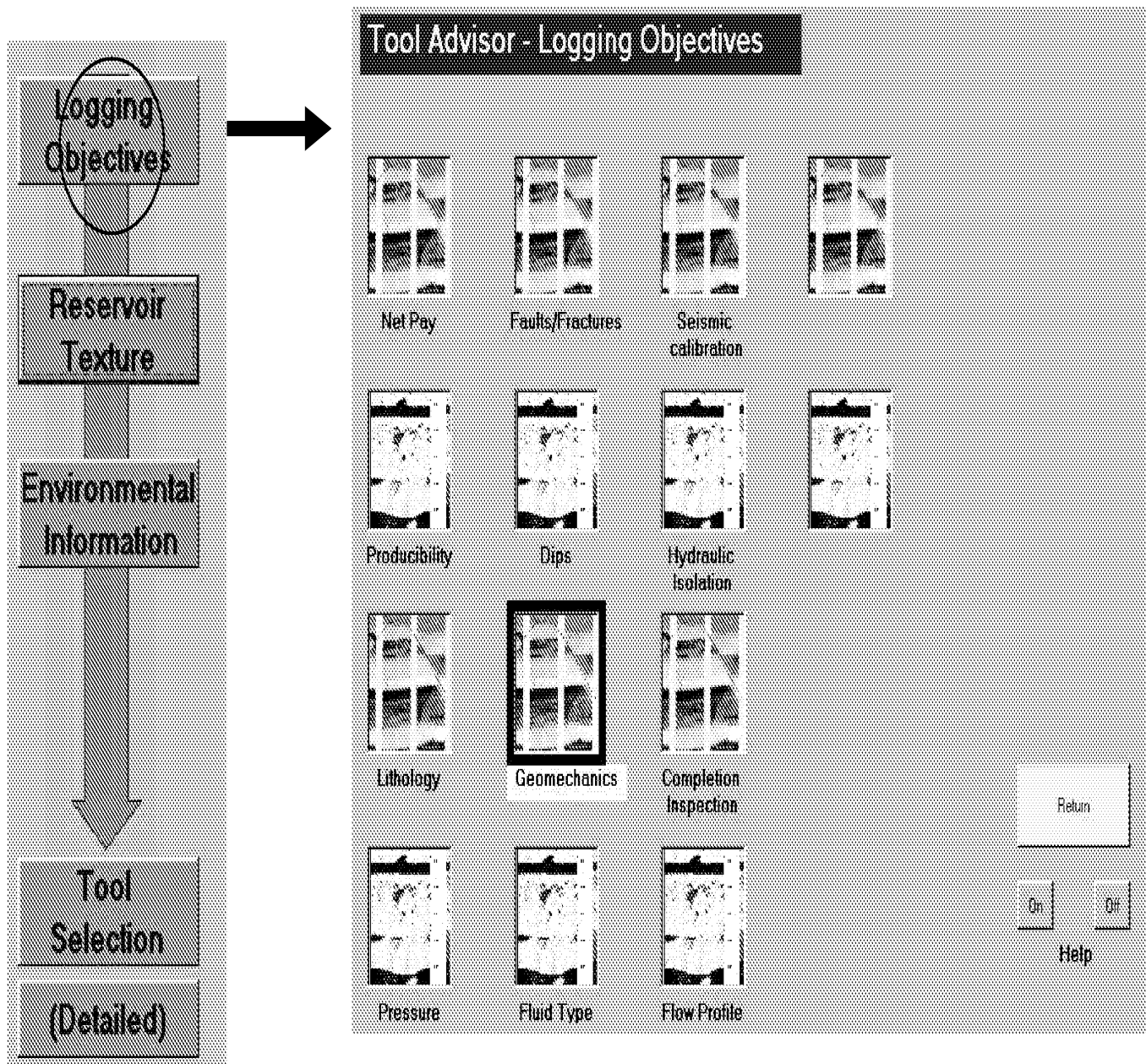
*The program is written in VB.*

*However a review process must be carried out before distribution.*

*Further info: contact Jim White*

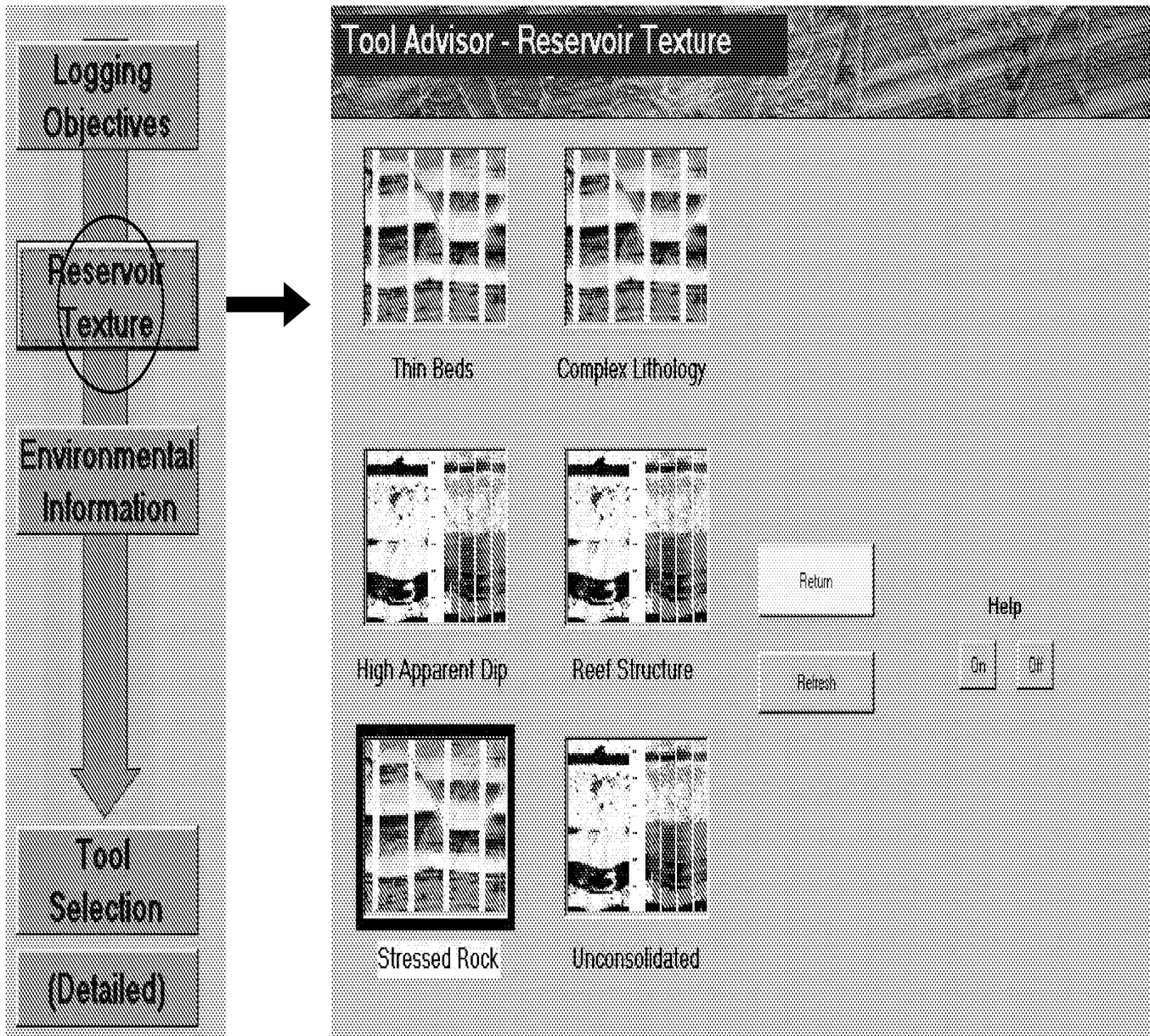
*Snapshots of screen are shown in following pages.*

## Sample screen - select Client Needs (Logging Objectives)



Select what the client wants to get out of the data.... (here Geomechanics)

## Sample screen - select Reservoir Texture



Select any additional information on reservoir texture....  
(For example, we know the rock is subjected to unbalanced stresses)

# Sample screen - select Environment

**Tool Advisor - Environmental Effects**

Logging Objectives

Reservoir Texture

**Environmental Information**

Tool Selection (Detailed)

**Borehole Diameter**

☐ 4"-6" ☒ 8"-12" ☐ 12"-18" ☐ >18"

**Mud Weight**

☐ ppg

**Borehole Temperature**

☐ 400F - 500F ☐ 250F - 400F ☒ 300F - 350F ☐ 250F - 300F ☐ <250F

**Well Deviation**

☐ On ☐ Off

**Borehole Resistivity**

☐ < 0.2 @ BHT ☐ > 0.2 @ BHT ☒ Oil Base Mud ☐ Cased Hole

**Hole Condition**

**Reservoir**

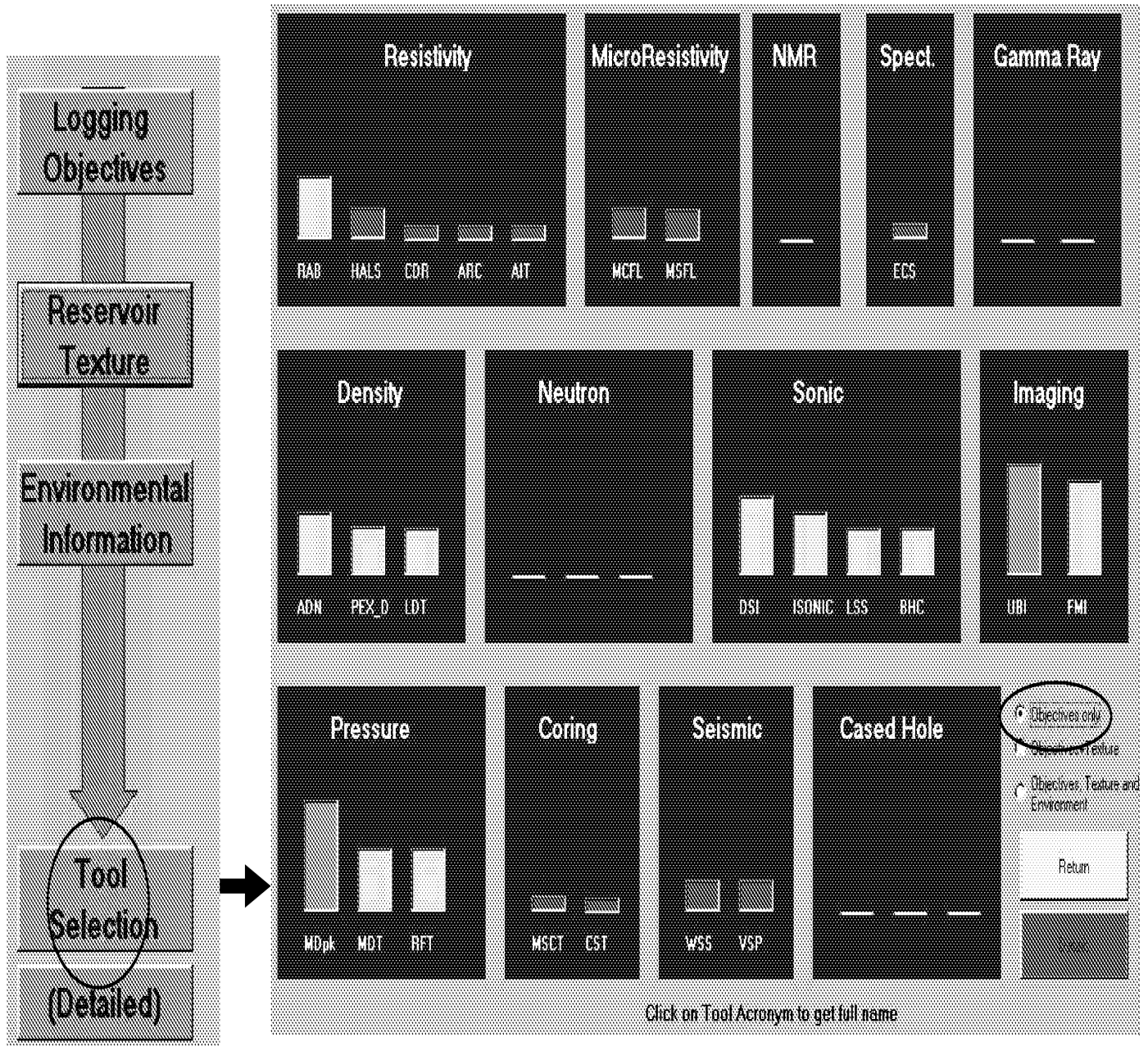
**Conveyance Method**

**Help**

**Return**

Select known environmental effects/limits (here bit size is 8.5", BHT=310, mud is OBM)

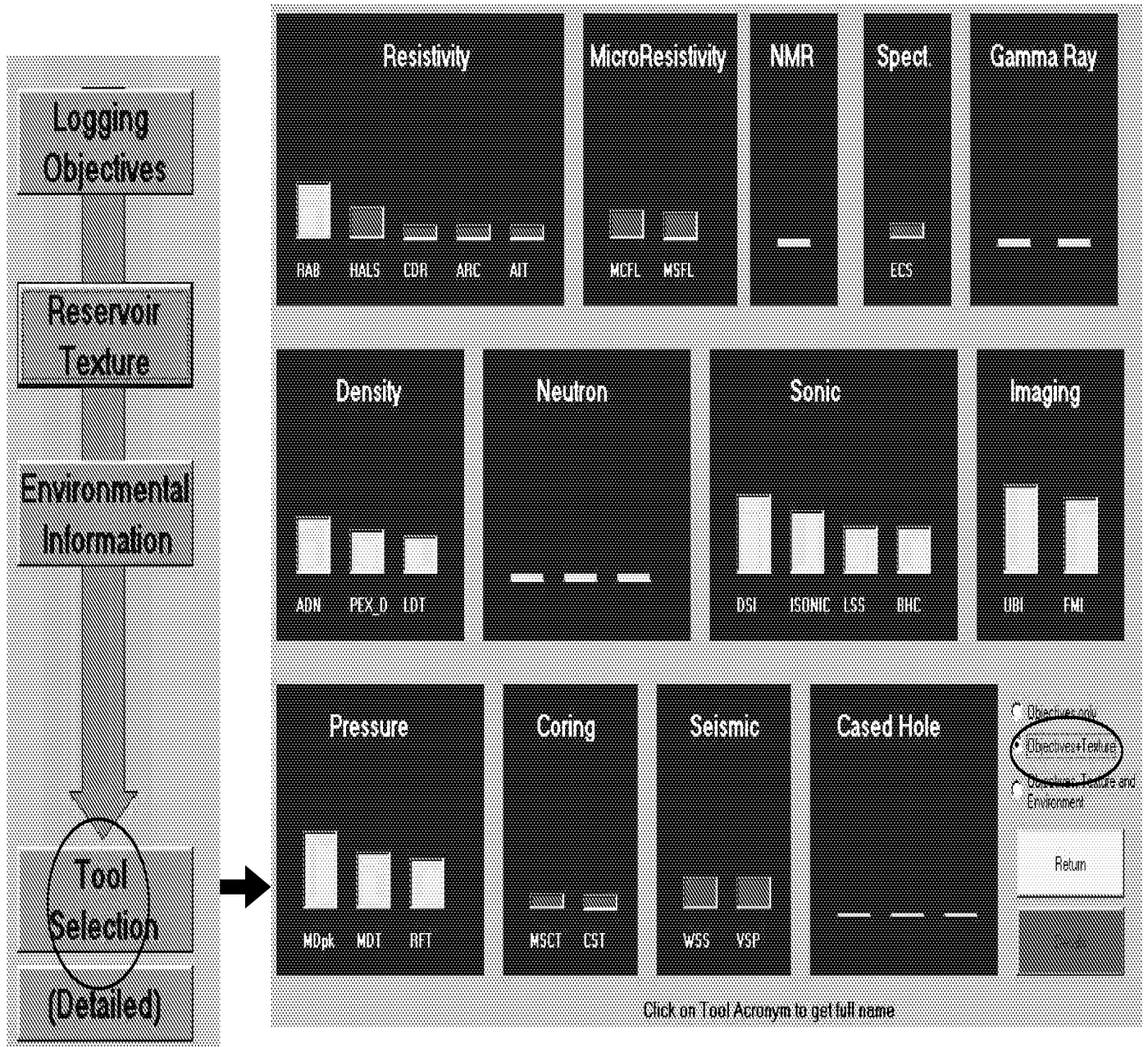
# Sample screen - Review ranking of equipment, for selection



Here is a display ranking the tools *in each sensor category*.... that shows the impact of the various selections made previously. Here **ONLY** the impact of logging objectives (ie. Geomechanics) is shown, without the additional impact of Reservoir Texture or Environmental Information. See later screens to show impact of this additional information.

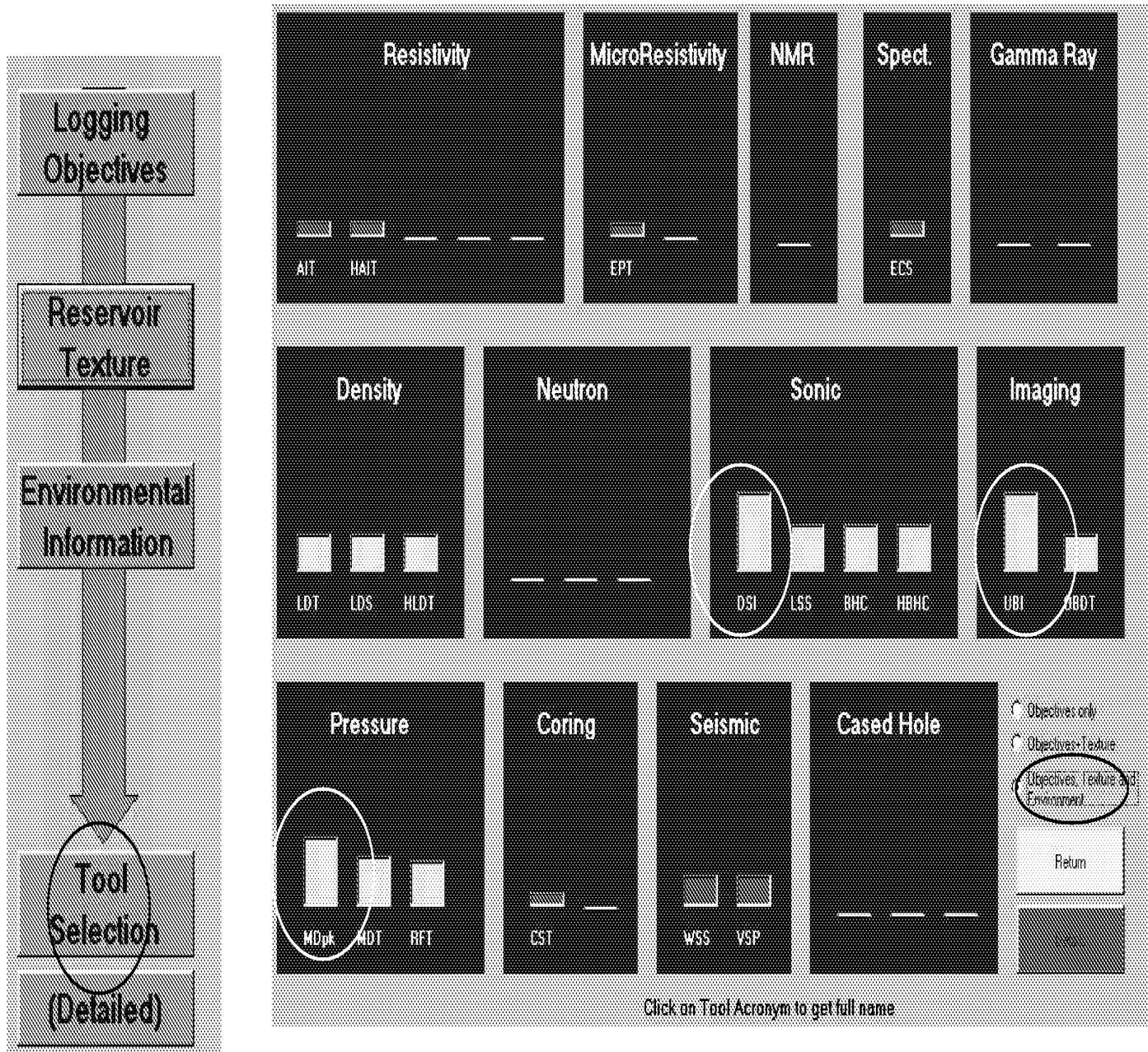


## Refining the choice of tools by adding in more constraints.



Now the additional impact on sensor selection from “Reservoir Texture” is included. (For example the stressed rock option chosen earlier degrades the ability of the MDT packer and imaging tools to make such good measurements, as borehole condition is likely to be degraded. Green code is good, Yellow is OK, Red means only use if nothing else available!)

Refining the choice of tools by adding *yet more* constraints.



Now the additional impact on sensor selection from “Environmental Information” is included. (For example the RAB does not image in OBM, and also has a temperature limitation, so cannot be included in the list of available tools.) Based on this analysis, we should include UBI, DSI and MDT packer technology to address the Client need in this reservoir, along with LDT and perhaps VSP.

## Other Issues:

- A working demonstration “Advisor” program exists
- Need to get corporate agreement on *ranking of sensors*.
- Need brief on line help (eg. *what is DSI, and why is it chosen to help with Geomechanics?*)
- Who will keep software updated
- We should be able to suggest an Answer Product that addresses initial need.